244-173 German pat. 128,658, 12.514
Austrian 9.694
1900
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A.D. 1900. JULY 11. Nº 12,514.

KALISCH'S COMPLETE SPECIFICATION. (1 SHEET)

416/128

1270-1353.28

Fig. 1

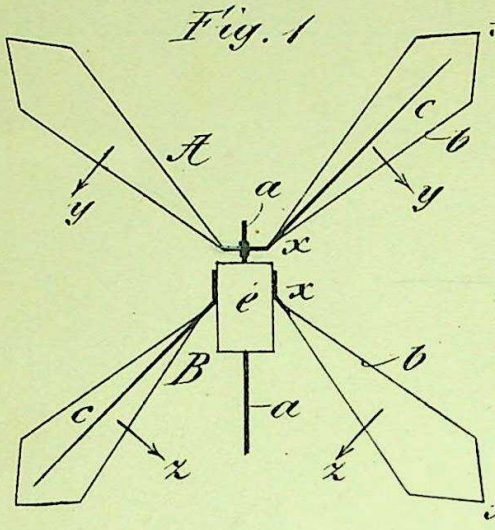

Fig. 2

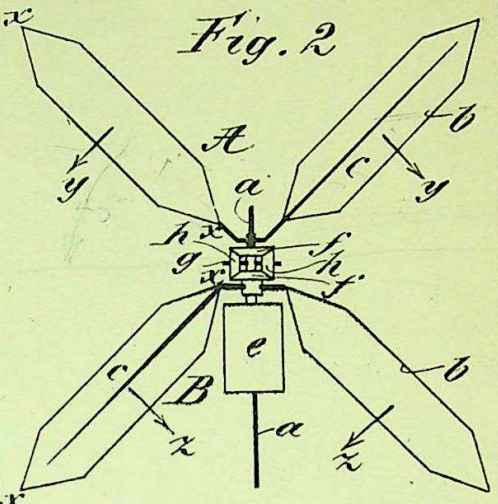

Fig. 3

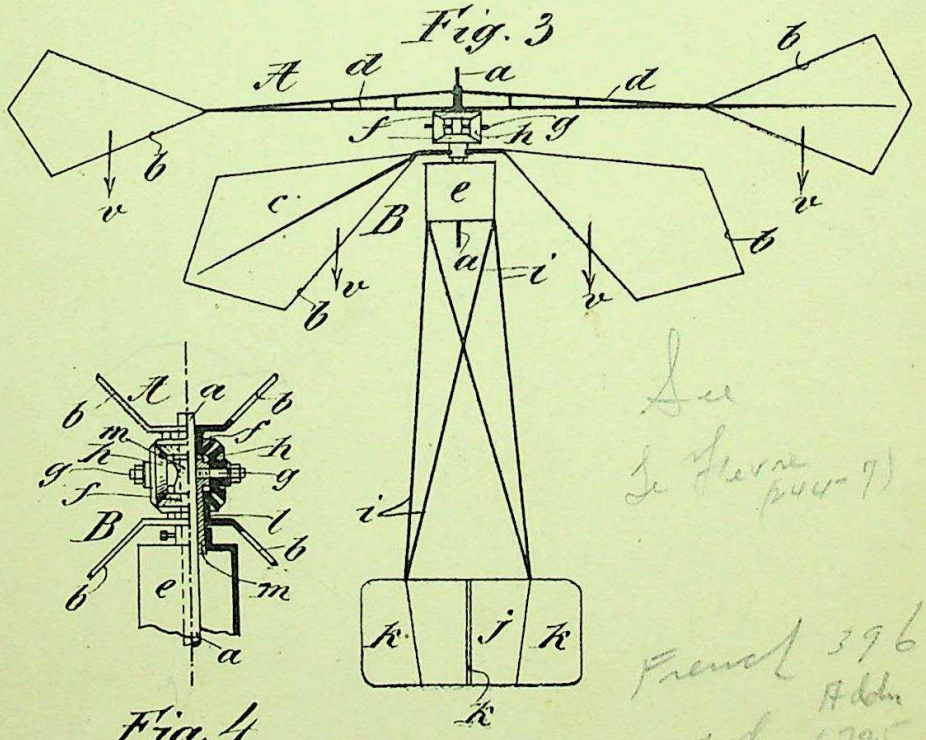

Fig. 4

[This Drawing is a reproduction of the Original on a reduced scale.]

Malby & Sons, Photo-Litho.

N° 12,514 A.D. 1900

Date of Application, 11th July, 1900—Accepted, 1st Sept., 1900

COMPLETE SPECIFICATION.

Improved Double Screw Propeller for Flying Machines.

I, EMANUEL KALISCH, of No. 12, Csányi-utcza, Budapest III, in the Kingdom of Hungary, Artist, do hereby declare the nature of my said invention and in what manner the same is to be performed, to be particularly described and ascertained in and by the following statement:—

This invention relates to a double-screw propeller which is destined for use both in connection with flying machines proper and such that serve as toys, and is based on a special arrangement of the propeller wings or blades, by which the greatest effect in driving power can be attained. The said double-screw propeller consists of two screws (air screws) provided with wings or blades arranged behind each other or one over the other; these screws rotate on one common axle in opposite directions and in consequence of their peculiar arrangement, their mutual action is not interrupted or interfered with and the driving power acts in the longitudinal direction of the flying machine *i.e.* centrally, whereby the most favourable result, both as regards the propulsion and stability of the machine, is attained.

Referring to the accompanying drawings

Figs. 1, 2 and 3 are diagrammatical views of three forms of the double-screw propeller,

Fig. 4 is a constructive detail of Figs. 2 and 3 in section and on a larger scale.

The improved double-screw propeller consists of two air screws arranged behind each other or one over the other and rotating in one common axle *a* in opposite directions; these screws are provided with two or more suitably shaped wings or blades *b* whose lower ends *c* are inclined towards the direction of rotation, so that they form with the plane carried through the direction of rotation an angle of 45° at the most. The angle may vary within 45° but must not exceed 45°.

Since by a simple arrangement of two air screws over or behind one another, the current of air repels the upper or front screw, and comes in contact with the lower or rear screw and thereby affects the action of the same, the present propelling system involves an arrangement whereby this draw-back is obviated. The wings are so arranged that their longitudinal axles *x*—*x*, as shown in Figs. 1 and 2, are inclined towards the rotating axle *a* at an angle of 45°, but towards one another at an angle of about 90°. In this case, the upper or front air screw will repel the air in the directions of the arrows *y* and the lower or rear screw will repel the air in the directions of the arrows *z* whereby the wings of the one screw can never come in contact with the current of air produced by the other screw, nor their action be affected.

The same effect is attained by the arrangement in Fig. 3, according to which the wings *b* of the upper or front screw are so widely extended by radial arms *d* that the current of air driven back by these long-armed wings, cannot come in contact with the other screw, as shown by the arrows *v* in Fig. 3. Since the short-armed wings traverse a smaller path, their total area must be greater than that of the long-armed wings.

[*Price* 8*d*.]

The rotation in an opposite direction can be imparted to both air screws in a different ways by rigidly connecting either the air screw A to the rotating axle *a* or the air screw B to the motor casing or frame *e* (Fig. 1) or by again rigidly connecting the air screw B to a sleeve *l* rotating on the axle *a* in an opposite direction (Figs. 2, 3 and 4). In the former case, the two screws rotate in opposite directions because the motor with casing or frame, as a body freely suspended in the air, has the tendency to rotate in an opposite direction to that of the screw A and takes the screw B rigidly connected therewith, whilst in the latter case, the opposite rotation of both screws is produced by means of known mechanism, for instance, by conical gearing or so-called differential gearing, as shown in Fig. 4 according to which the intermediate wheels *h* run on lateral pivots *g* of a bush *m* passing between shaft *a* and sleeve *l* and rigidly connected to the motor or its casing *e* whilst the driving wheels *f* are rigidly connected to the air screws. In this case, the motor or its casing or frame is not compelled to take part in the rotations, but remains immovable, so far as the rotating wings are concerned.

In the case where the propeller is fixed to the motor casing and the latter therefore participates in the rotary movement of the same, the car may be connected to the motor frame by means of a ball and socket joint or other equivalent means so that the car, since it is not rigidly attached to the motor casing, is not compelled to participate in the movement of the same.

Fig. 3 illustrates the result, which can be obtained by using the double-screw propeller in connection with a flying machine. The frame *i* of the flying machine can be arranged in a most favourable form, as a long extended body, concentrically on the rotating axle *a* or on its extension so that the current of air of the double-screw propeller acts centrically or axially on the apparatus, propels the latter in an axial direction and in consequence of this arrangement the apparatus secures the greatest possible stability especially as the wings are mostly attached above at the end of the apparatus and the centre of gravity is below. Such apparatus can likewise be directed or steered in a very easy manner in that, for instance, one or more steering surfaces similar to the rudder of a ship are provided at a suitable part, or the wings are made adjustable in all directions by means of a suitable mechanism. Any oscillatory movements of the apparatus can be obviated by providing radial surfaces *k* on the frame *i* or basket *j*. Experiments with models have shown that this double-screw propeller enables flying machines proper, or small flying machines serving as toys, to fly upwards and laterally in the most perfect manner and that very good results can also be attained by propelling the machine by mere man-power.

Having now particularly described and ascertained the nature of the said invention and in what manner the same is to be performed I declare that what I claim is:—

1/ An improved double-screw propeller characterized by two air screws provided with wings or blades arranged behind each other or one over the other, and rotating on one common axle in opposite directions, the lower ends of the wings of such screws being located at an angle of 45° and so arranged that their mutual action is not interfered with, substantially as described and shown in the drawings.

2/. A double-screw propeller as set forth in Claim 1/, in which for the purpose of preventing the two air screws being affected by the air driven back by the same, the two air screws are so arranged that the longitudinal axles of their wings are inclined at an angle of about 45° to the rotating axle, but to one another at an angle of 90° or the wings of the one propeller are extended beyond the wings of the other propeller by means of radial arms, substantially as described and shown in the drawings.

3/. A double-screw propeller as set forth in Claim 1, in which the one air-screw is always rigidly connected to the rotating axle, whilst the other screw is rigidly

connected either to the motor casing or frame, or to a sleeve rotating on the axle in an opposite direction to the same, substantially as described and shown in the drawings.

Dated this 11th day of July 1900.

J. E. EVANS-JACKSON & Co.,
Agents for the Applicant.

Redhill: Printed for Her Majesty's Stationery Office, by Malcomson & Co., Ltd.—1900.

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